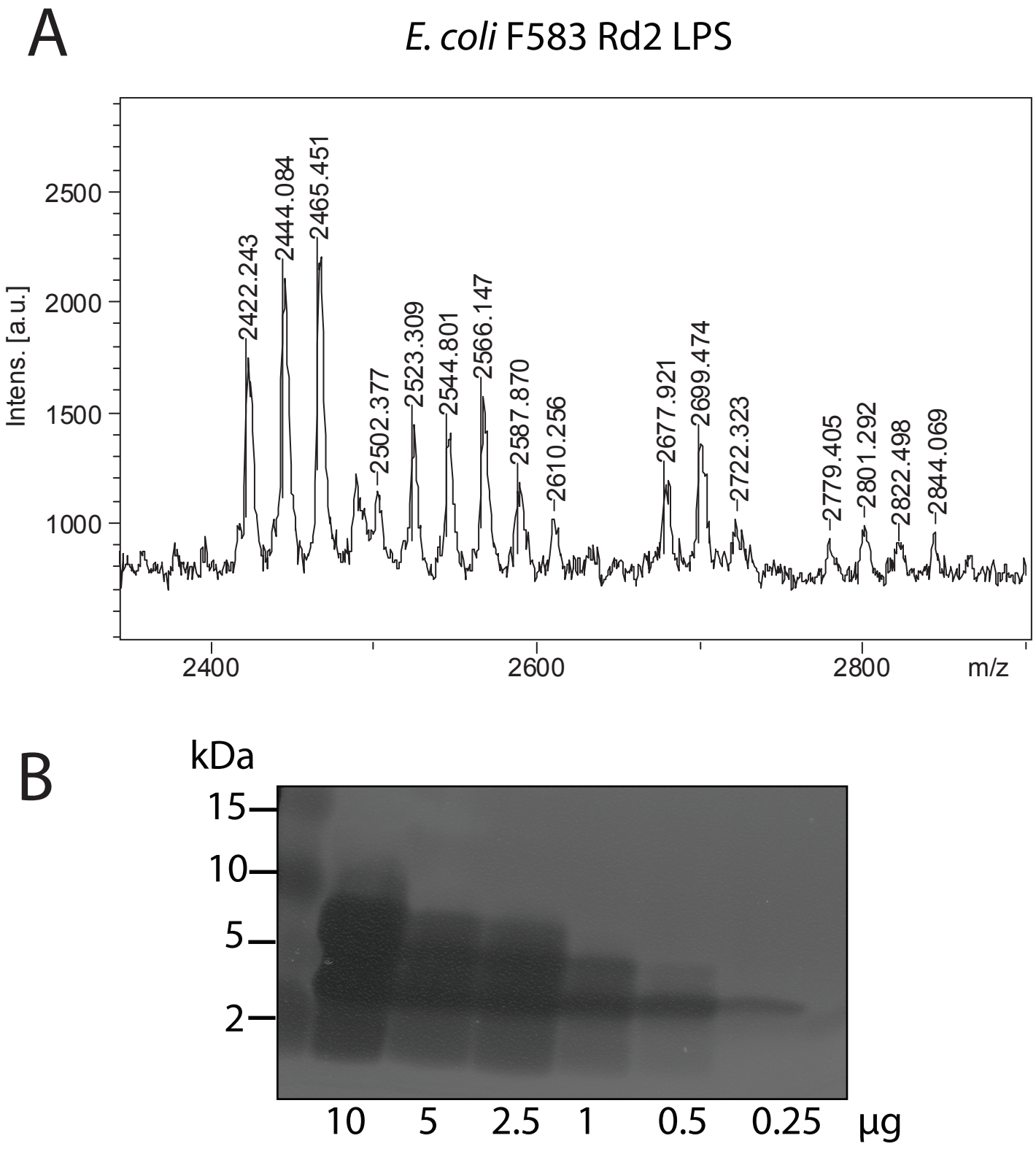
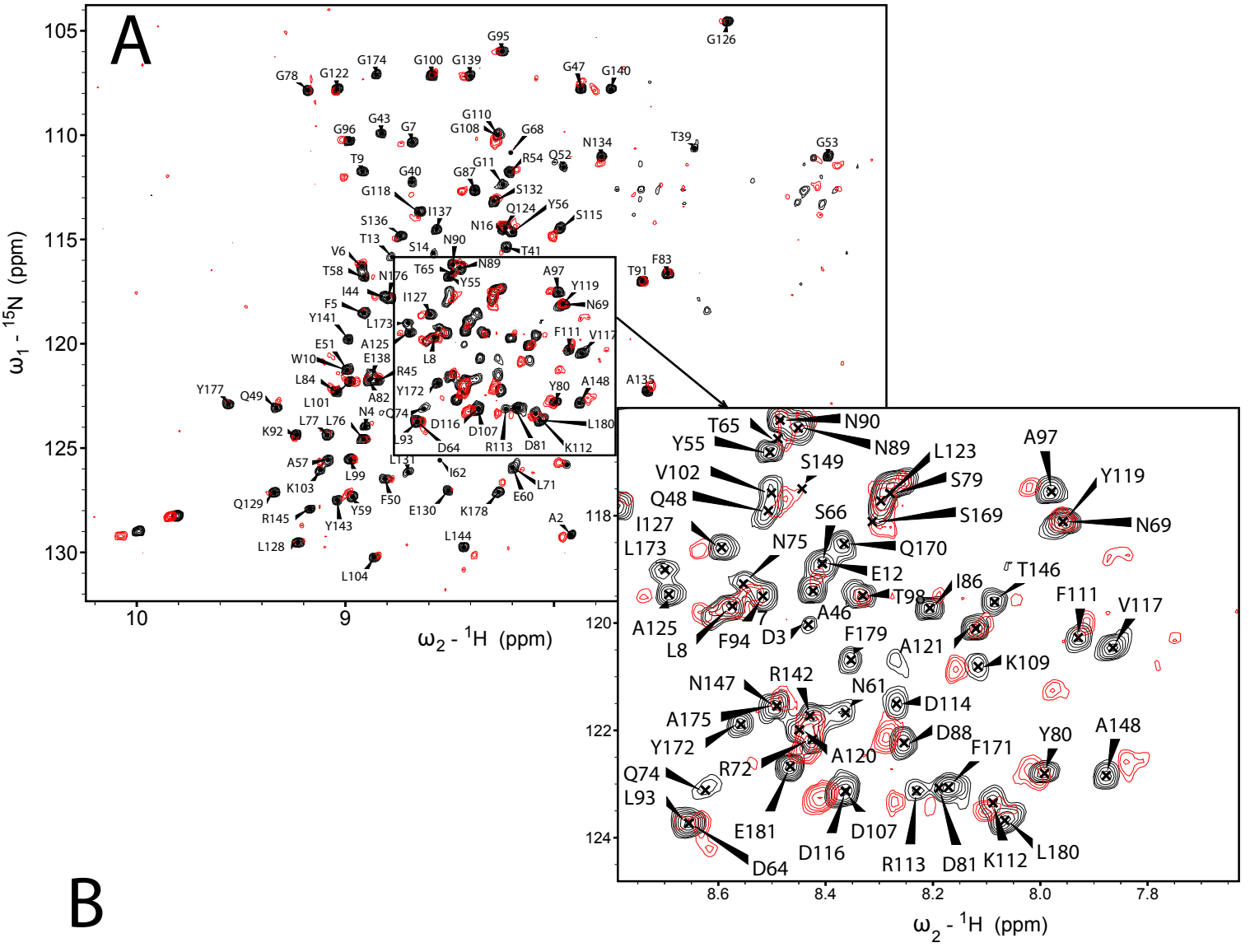
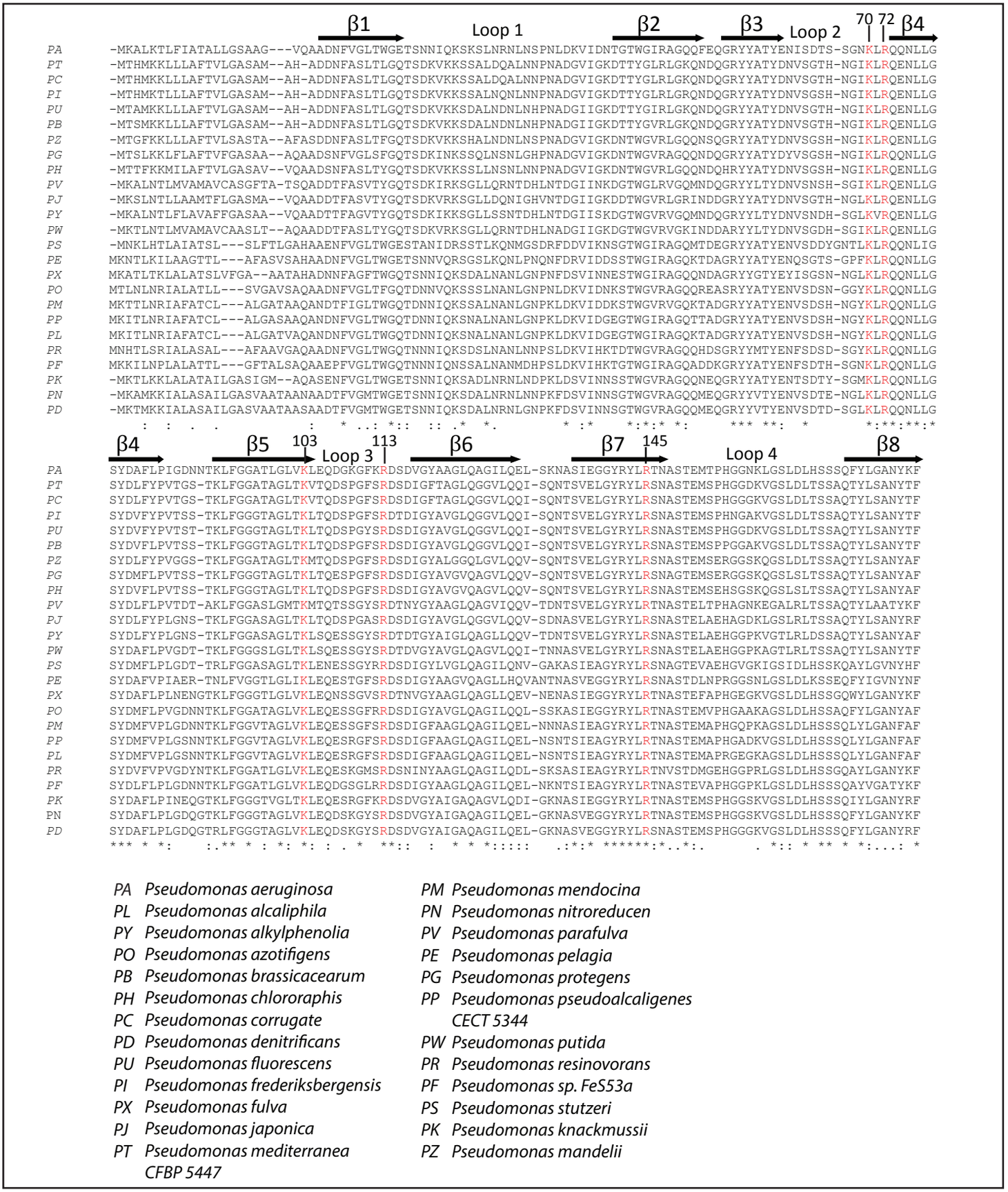


Supplemental Figure 1. Characterization of Rd2 LPS from *E. coli* F583. (**A**) MALDI mass spectrum of Rd2 LPS from *E. coli* F583 with m/z values of the main peaks indicated. (**B**) Zinc-imidazole-stained SDS-PAGE gel with different amounts of Rd2 LPS from *E. coli* F583 applied to lanes as indicated.

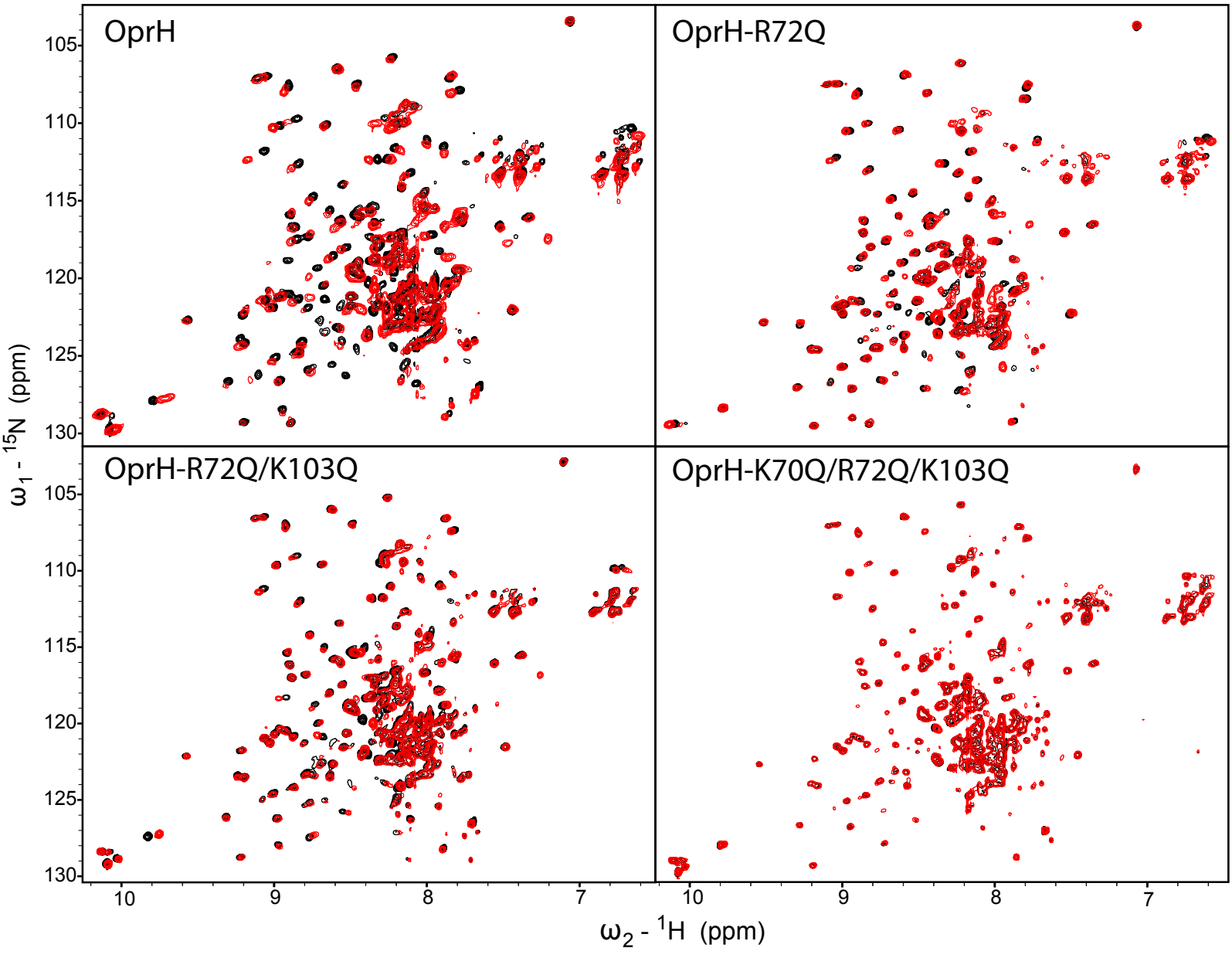


Supplemental Figure 2. Chemical shift perturbations in ^{15}N-^{1}H TROSY spectra upon addition of Rd2 LPS from *E. coli* F583 to ^{2}H-,^{13}C-,^{15}N-labeled OprHΔL1ΔL4 in DHPC micelles. (**A**) ^{15}N-^{1}H TROSY spectrum of 0.2 mM OprHΔL1ΔL4 (black) in DHPC micelles overlaid onto the spectrum of OprHΔL1ΔL4 in DHPC:Rd2 LPS mixed micelles (red, 10:1 Rd2 LPS:OprH molar ratio). (**B**) Compound chemical shift changes $\Delta\delta_{comp}=[\Delta\delta^2_{HN} + (\Delta\delta_N/6.5)^2]^{1/2}$) resulting from the addition of 2 mM Rd2 LPS (black) relative to the chemical shifts of 0.2 mM OprHΔL1ΔL4 in DHPC only. Unassigned residues are marked with blue ticks, and removed loop residues are marked with green ticks.



PA	*Pseudomonas aeruginosa*
PL	*Pseudomonas alcaliphila*
PY	*Pseudomonas alkylphenolia*
PO	*Pseudomonas azotifigens*
PB	*Pseudomonas brassicacearum*
PH	*Pseudomonas chlororaphis*
PC	*Pseudomonas corrugate*
PD	*Pseudomonas denitrificans*
PU	*Pseudomonas fluorescens*
PI	*Pseudomonas frederiksbergensis*
PX	*Pseudomonas fulva*
PJ	*Pseudomonas japonica*
PT	*Pseudomonas mediterranea CFBP 5447*
PM	*Pseudomonas mendocina*
PN	*Pseudomonas nitroreducen*
PV	*Pseudomonas parafulva*
PE	*Pseudomonas pelagia*
PG	*Pseudomonas protegens*
PP	*Pseudomonas pseudoalcaligenes CECT 5344*
PW	*Pseudomonas putida*
PR	*Pseudomonas resinovorans*
PF	*Pseudomonas sp. FeS53a*
PS	*Pseudomonas stutzeri*
PK	*Pseudomonas knackmussii*
PZ	*Pseudomonas mandelii*

Supplemental Figure 3. Clustal Omega alignment of OprH from *P. aeruginosa* and other closely related outer membrane proteins. Absolutely conserved residues are marked in the bottom line with "*", highly conserved residues with ":", and partially conserved with ".". Absolutely conserved Lys and Arg residues localized in loops 2 and 3 and in strand 7 are highlighted in red. β-strands are indicated with arrows above the sequences. Residue R142, although conserved, is not highlighted because it is facing the lumen of the barrel and therefore cannot interact with LPS.



Supplemental Figure 4. ^{15}N-^{1}H TROSY spectra of ^{15}N-labeled OprH, OprH-R72Q, OprH-R72Q/K103Q and OprH-K70Q/R72Q/K103Q in DHPC micelles (black), overlaid onto the spectra of corresponding proteins in DHPC:Kdo2-lipid A mixed micelles at 10:1 Kdo2-lipid A:protein molar ratio (red).